

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD-ARTESIA

FORM APPROVED
OMB No. 1004-0135
Expires July 31, 1996SEP 19 2008
OCD-ARTESIASUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter an
abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side

1. Type of Well <input type="checkbox"/> Oil Well <input checked="" type="checkbox"/> Gas Well <input type="checkbox"/> Other		S
2. Name of Operator Cimarex Energy Co. of Colorado		
3a. Address PO Box 140907; Irving, TX 75014-0907	3b. Phone No. (include area code) 972-401-3111	
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) 22-25S-26E 1250 FSL & 760 FEL		5. Lease Serial No. NM-94839
		6. If Indian, Allottee or Tribe Name
		7. If Unit or CA/Agreement, Name and/or No.
		8. Well Name and No. Cottonwood Draw 22 Federal Com No. 1
		9. API Well No. 30-015-36592
		10. Field and Pool, or Exploratory Area Cottonwood Draw; Morrow Wildcat
		11. County or Parish, State Eddy County, NM

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input checked="" type="checkbox"/> Other Add BHL, drill as
	<input checked="" type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	Wolfcamp lateral
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, included estimated starting date of any proposed work and approximate duration thereof.

If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

Cimarex requests approval to drill the Cottonwood Draw 22 Federal Com No. 1 as a horizontal Wolfcamp gas test (S2) instead of the permitted vertical Morrow test (E2) using Cactus Rig 122 instead of the permitted Patterson Rig 80.

First, Cimarex proposes to change intermediate casing depth from the APD depth of 2725' to a new depth of 1789' (just above the top of the Delaware) in order to evaluate Bell Canyon Sandstones. Change can be seen on attached chart.

Cimarex proposes to drill an 8 3/4" pilot hole to 10,100' and plug back open hole to 9310' with a 790' Class H plug. Then kick off 6 3/4" hole at 9305' and drill through the curve and set 5 1/2" LTC casing from 0' to 9150' and 4 1/2" BTC casing from 9150' to TD, cement to 1589'. If 75% or greater lost circulation occurs while drilling the intermediate hole, the cement on the production casing will be TOC 0.

However, if it is determined that higher mud weights will be needed while drilling through the Wolfcamp formation, Cimarex proposes to drill a pilot hole to 10100,' set 7" casing in the pilot hole, cement the pilot hole to 1589,' set whipstock plug at 9315,' mill window from 9300' to 9310' and kick off 6 3/4" lateral at 9305,' set 4 1/2" casing from liner hanger @ 9188' to TD, and cement to 8988' (as shown on attached page).

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

Please see attached revised rig plat, choke manifold diagram, flexible choke spec sheet, CIP2, preliminary directional survey, alternate drilling plan, and cement additive specs.

14. I hereby certify that the foregoing is true and correct

Name (Printed/Typed)

Zeno Farris

Signature

Zeno Farris

Title

Manager Operations Administration

Date

September 12, 2008

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Title

Office

APPROVED

SEP 16 2008

WESLEY W. INGRAM
PETROLEUM ENGINEER

Conditions of Approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on reverse)

Permitted Casing Proposal: (Vertical Morrow)

Hole	Hole Size	Depth	Casing OD	Weight	Thread	Collar	Grade	Mud Wt	Mud Visc	Fluid Loss	Mud Type
Surface	17½"	0' to 315'	New 13¾"	48#	8-R	STC	H-40	8.4-8.6	30-32	May lose	FW spud mud, paper, high visc. sweeps
Intermediate	12¾"	0' to 2725'	New 9¾"	40#	8-R	LTC	J-55	9.7-10	28-29	May lose	Brine water, paper, lime, high visc. sweeps
Pilot Hole	8¾"	0' to 12500'	New 5½"	17#	8-R	LTC	P-110	8.4-10	28-45	NC	Brine water, paper, lime

Surface: 500 sx Class C + 2% CaCl₂ (wt 14.8, yld 1.34)

Intermediate: Lead 600 sx Interfill C + 1/4# Flocele (wt 11.9, yld 2.45), Tail 400 sx Premium Plus Neat + 1% CaCl₂ (wt 14.8, yld 1.33)

Production: Stage 1 Lead 270 sx Interfill H + 0.25% HR-7 + 5# Gilsonite + 0.25# Flocele, Tail 610 sx Super H + 0.5% Halad-344 + 0.4% CFR-3 + 1# Salt + 5# Gilsonite + 0.125# Poly-e-flake + 0.35% HR-7 (wt 13, yld 1.67)

Stage 2 Lead 800 sx Interfill H + 1/4# Poly-e-flake (wt 11.9, yld 2.45), Tail 150 sx Super H + 0.5% Halad-344 + 0.4% CFR-3 + 1# Salt + 5# Gilsonite + 0.125# Poly-e-flake + 0.35% HR-7 (wt 13, yld 1.67)
TOC 2400'

Proposed Alternate Casing Proposal: (Horizontal Wolfcamp, Drill through curve)

Hole	Hole Size	Depth	Casing OD	Weight	Thread	Collar	Grade	Mud Wt	Mud Visc	Fluid Loss	Mud Type
Surface	17½"	0' to 315'	New 13¾"	48#	8-R	STC	H-40	8.4-8.6	30-32	May lose	FW spud mud, paper, high visc. sweeps
Intermediate	12¾"	0' to 1789'	New 9¾"	40#	8-R	LTC	J-55	9.7-10	28-29	May lose	Brine water, paper, lime, high visc. sweeps
Pilot Hole (not cased)	8¾"	0' to 10100'	**Open hole, Plug back to 9310' w/ 790' Class H plug					8.4-10	28-45	NC	Brine water, paper, lime
Production (vertical only)	8¾"	0' to 9150'	New 5½"	17#	8-R	LTC	P-110	9	28-32	May lose	2% KCl
Lateral	6¾"	9150' to 13365'	New 4½"	11.6#	8-R	BTC	P-110	9	28-32	May lose	2% KCl

Surface: 500 sx Class C + 2% CaCl₂ (wt 14.8, yld 1.34)

Intermediate: Lead 600 sx Interfill C + 1/4# Flocele (wt 11.9, yld 2.45), Tail 400 sx Premium Plus Neat + 1% CaCl₂ (wt 14.8, yld 1.33)

Plug Back Plug: 450 sx Premium Class H + 0.75% CFR-3 + 0.3% HR-7 (wt 17.5, yld 0.94)

Lateral: Stage 1

Lead: 400 sx Interfill H + 0.25% HR-7 + 5# Gilsonite + 0.25# Flocele (wt 11.9, yld 2.46)

Tail: 450 sx Super H + 0.5% Halad-344 + 0.4% CFR-3 + 1# Salt + 5# Gilsonite + 0.125# Poly-e-flake + 0.35% HR-7 (wt 13, yld 1.67)

Stage 2 (DV tool 6000')

550 sx Interfill H + 0.125# Poly-e-flake (wt 11.9, yld 2.47)

TOC 1589' (if 75% or greater returns are lost while drilling intermediate casing, TOC for lateral will be 0')

Proposed Alternate Casing Contingency Proposal: (Horizontal Wolfcamp, Mill out of 7" casing)

Hole	Hole Size	Depth	Casing OD	Weight	Thread	Collar	Grade	Mud Wt	Mud Visc	Fluid Loss	Mud Type
Surface	17½"	0' to 315'	New 13¾"	48#	8-R	STC	H-40	8.4-8.6	30-32	May lose	FW spud mud, paper, high visc. sweeps
Intermediate	12¾"	0' to 1789'	New 9¾"	40#	8-R	LTC	J-55	9.7-10	28-29	May lose	Brine water, paper, lime, high visc. sweeps
Pilot Hole	8¾"	0' to 10100'	New 7"	26#	8-R	LTC	P-110	9.2-10.5	36-44	May lose	DuoVis (viscosity), bulk bar (fluid wt), lime (pH),
Lateral	6¾"	9188' to 13365'	New 4½"	17#	8-R	LTC	P-110			May lose	PolyPac (fluid loss)

Surface: 500 sx Class C + 2% CaCl₂ (wt 14.8, yld 1.34)

Intermediate: Lead 600 sx Interfill C + 1/4# Flocele (wt 11.9, yld 2.45), Tail 400 sx Premium Plus Neat + 1% CaCl₂ (wt 14.8, yld 1.33)

Pilot Hole: Stage 1

Lead: 250 sx Interfill H + 0.25% HR-7 + 5# Gilsonite + 0.25# Flocele (wt 11.9, yld 2.46)

Tail: 400 sx Super H + 0.5% Halad-344 + 0.4% CFR-3 + 1# Salt + 5# Gilsonite + 0.125# Poly-e-flake + 0.35% HR-7 (wt 13, yld 1.67)

Stage 2 (DV tool 6000')

400 sx Interfill H + 0.125# Poly-e-flake (wt 11.9, yld 2.47)

TOC 1589' (if 75% or greater returns are lost while drilling intermediate casing, TOC for lateral will be 0')

Lateral:

225 sx Super H (wt 13.2, yld 1.61), TOC 8988'

See CO #

DISTRICT I
1625 N. French Dr., Hobbs, NM 58240

DISTRICT II
1301 W. Grand Avenue, Artesia, NM 58210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 57505

State of New Mexico
Energy, Minerals and Natural Resources Department

Form C-102
Revised October 12, 2005

Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
		Wolfcamp Wildcat
Property Code	Property Name	Well Number
	COTTONWOOD DRAW "22" FEDERAL COM	1
OGRID No.	Operator Name	Elevation
162683	CIMAREX ENERGY CO. OF COLORADO	3289'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	22	25 S	26 E		1250	SOUTH	760	EAST	EDDY

Bottom Hole Location If Different From Surface

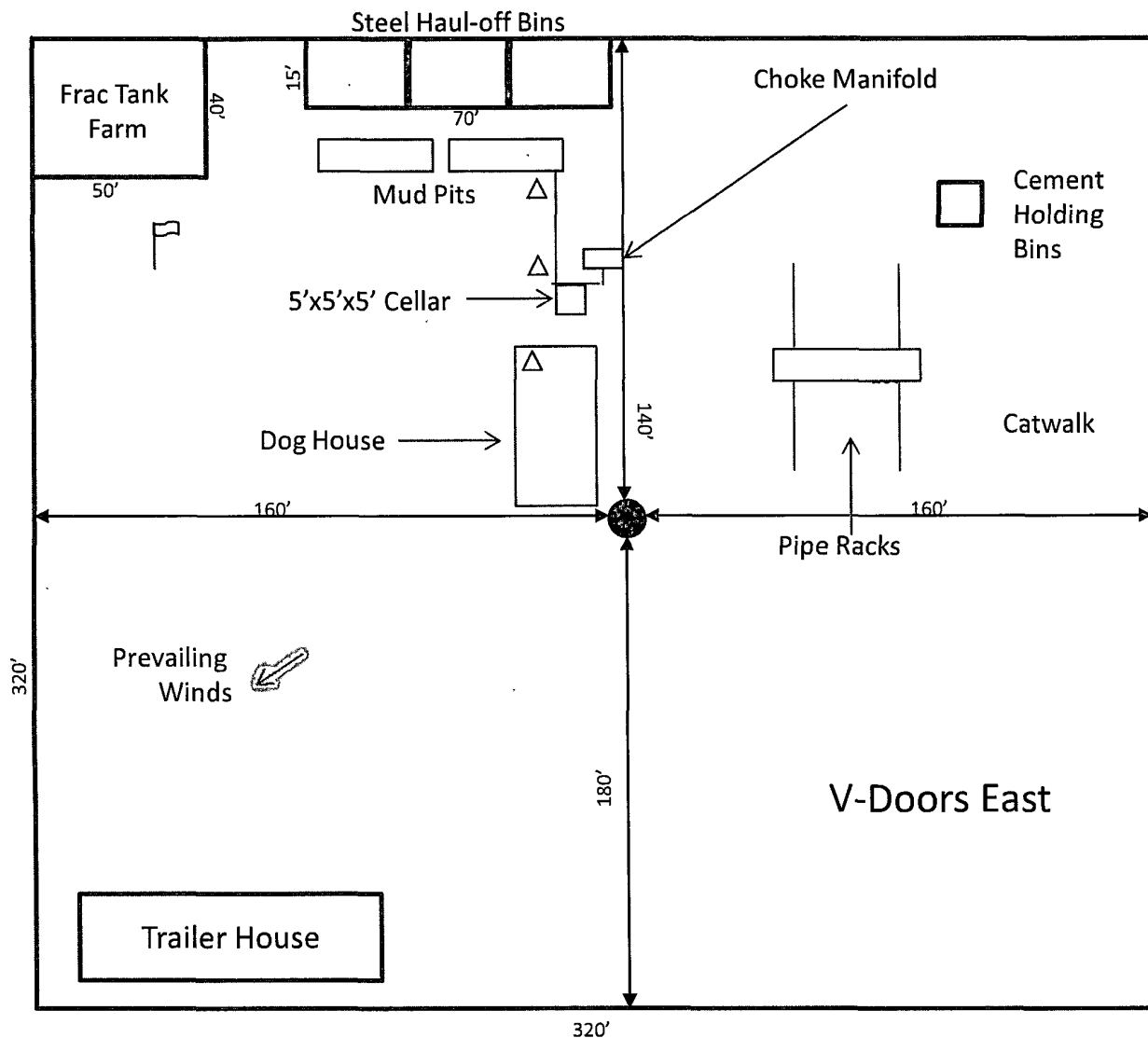
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	22	25 S	26 E		660	SOUTH	660	WEST	EDDY
Dedicated Acres	Joint or Infill	Consolidation Code	Order No.						
160									

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

<p>BHL 660 FSL & 660 FWL</p> <p>PP 1250 FSL & 760 FEL</p> <p>SHL 1250 FSL & 760 FEL</p> <p>BOTTOM HOLE LOCATION Lat - N32°06'35.85" Long - W104°17'13.42" NMSPCE- N 403742.552 E 555664.385 (NAD-83)</p> <p>SURFACE LOCATION Lat - N32°06'41.36" Long - W104°16'27.95" NMSPCE- N 404301.3 E 559574.4 (NAD-83)</p> <p>3298.0' 3285.5' 3287.3' 3277.2' 1250'</p> <p>3949.7'</p> <p>660'</p> <p>660'</p> <p>NM-94839</p>			<p>OPERATOR CERTIFICATION</p> <p>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.</p> <p><i>Natalie Krueger</i> 09-05-08 Signature Date</p> <p>Natalie Krueger Printed Name</p> <p>SURVEYOR CERTIFICATION</p> <p>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.</p> <p>JUNE 17, 2008 Date Surveyed</p> <p><i>Gary L. Jones</i> Signature & Seal Professional Surveyor</p> <p>Certificate No. Gary L. Jones 7977</p> <p>Basin Surveys</p>
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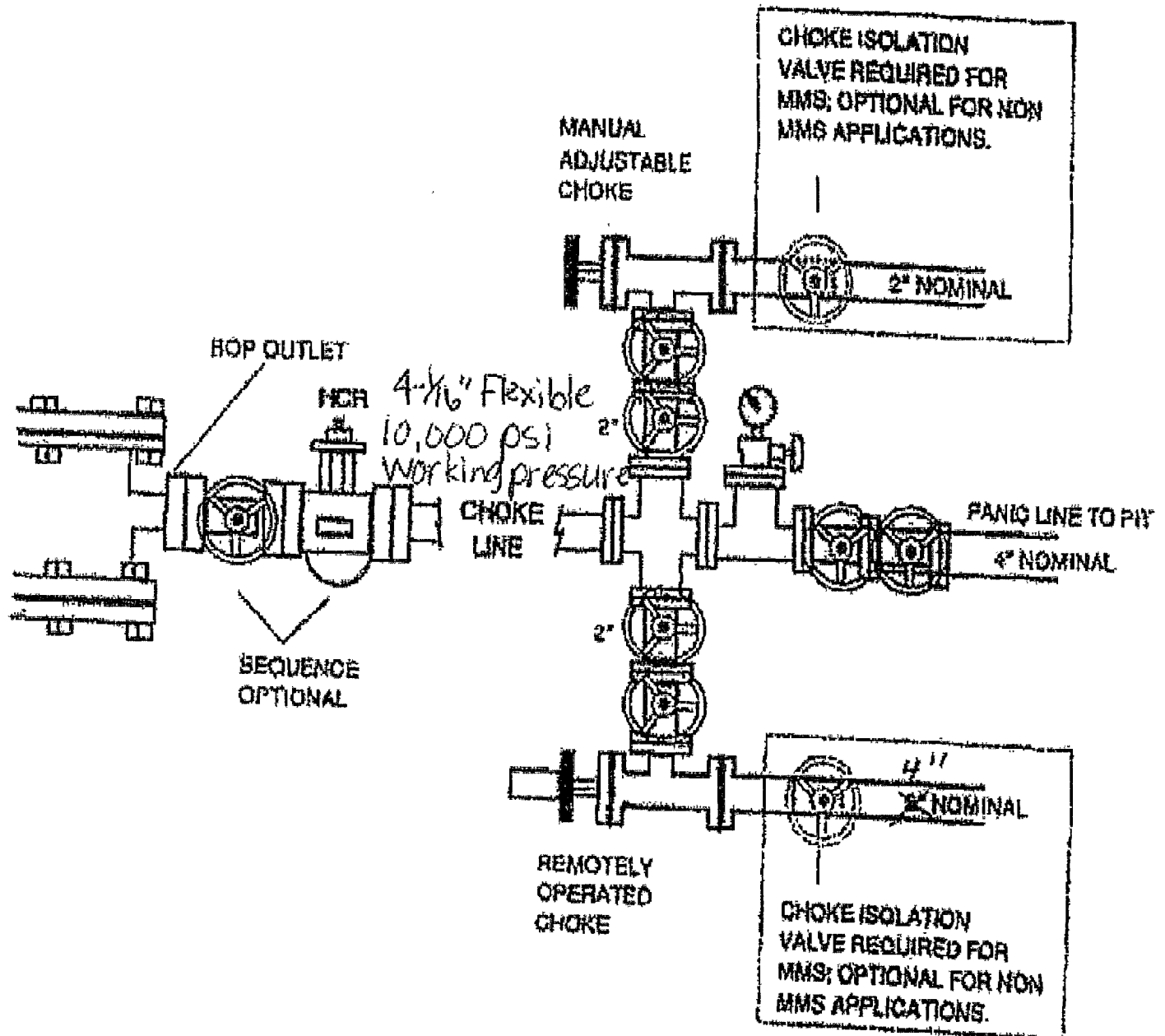
Cactus Rig 122

Cimarex Energy Co.
Irving, TX



Revised Rig Layout
Cottonwood Draw 22 Federal Com No. 1
SHL 1250 FSL & 760 FEL
BHL 660 FSL & 660 FWL
22-25S-26E
Eddy County, NM

DRILLING OPERATIONS
CHOKE MANIFOLD
5M SERVICE



Revised Choke Manifold
Cottonwood Draw 22 Federal Com No. 1
SHL 1250 FSL & 760 FEL
BHL 660 FSL & 660 FWL
22-25S-26E
Eddy County, NM



Midwest Hose
& Specialty, Inc.

Specification Sheet Choke & Kill Hose

The Midwest Hose & Specialty Choke & Kill hose is manufactured with only premium components. The reinforcement cables, inner liner and cover are made of the highest quality material to handle the tough drilling applications of today's industry. The end connections are available with API flanges, API male threads, hubs, hammer unions or other special fittings upon request. Hose assembly is manufactured to API 7K. This assembly is wrapped with fire resistant vermiculite coated fiberglass insulation, rated at 2000 degrees with stainless steel armor cover.

Working Pressure:	5,000 or 10,000 psi working pressure
Test Pressure:	10,000 or 15,000 psi test pressure
Reinforcement:	Multiple steel cables
Cover:	Stainless Steel Armor
Inner Tube:	Petroleum resistant, Abrasion resistant
End Fitting:	API flanges, API male threads, threaded or butt weld hammer unions, unbolt and other special connections
Maximum Length:	110 Feet
ID:	2-1/2", 3", 3-1/2", 4"
Operating Temperature:	-22 deg F to +180 deg F (-30 deg C to +82 deg C)



Planned Wellpath Report

Preliminary

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INTEQ

REFERENCE WELLPATH IDENTIFICATION

Operator	Cimarex Energy Co. of Colorado	Slot	No. 1H SHL
Area	Eddy County, NM	Well	No. 1H
Field	(Cottonwood) Sec 22, T25S, R26E	Wellbore	No. 1H PWB
Facility	Cottonwood Draw 22 FED COM No. 1H		

REPORT SETUP INFORMATION

Projection System	NAD83 / TM New Mexico State Planes, Eastern Zone (3001), US feet	Software System	WellArchitect® 2.0
North Reference	Grid	User	Victor Hernandez
Scale	0.999909	Report Generated	8/5/2008 at 3:18:43 PM
Convergence at slot	0.03° East	Database/Source file	WA_Midland/No._1H_PWB.xml

WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[USft]	Northing[USft]	Latitude	Longitude
Slot Location	0.00	0.00	559574.40	404301.30	32°06'41.363"N	104°16'27.952"W
Facility Reference Pt			559574.40	404301.30	32°06'41.363"N	104°16'27.952"W
Field Reference Pt			559574.40	404301.30	32°06'41.363"N	104°16'27.952"W

WELLPATH DATUM

Calculation method	Minimum curvature	Rig on No. 1H SHL (RT) to Facility Vertical Datum	18.00ft
Horizontal Reference Pt	Facility Center	Rig on No. 1H SHL (RT) to Mean Sea Level	3307.00ft
Vertical Reference Pt	Rig on No. 1H SHL (RT)	Facility Vertical Datum to Mud Line (Facility)	0.00ft
MD Reference Pt	Rig on No. 1H SHL (RT)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	261.87°



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Facility	Cottonwood Draw 22 FED COM No. 1H		

WELLPATH DATA (44 stations) † = interpolated/extrapolated station								
MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
0.00	0.000	261.867	0.00	0.00	0.00	0.00	0.00	Tie On
9305.00	0.000	261.867	9305.00	0.00	0.00	0.00	0.00	EST. KOP
9405.00†	30.000	261.867	9400.49	25.59	-3.62	-25.33	30.00	
9505.00†	60.000	261.867	9470.40	95.49	-13.51	-94.53	30.00	
9605.00†	90.000	261.867	9495.99	190.99	27.02	-189.07	30.00	
9609.73	91.418	261.867	9495.93	195.71	-27.69	-193.74	30.00	EOC
9705.00†	91.418	261.867	9493.57	290.96	-41.16	-288.03	0.00	
9805.00†	91.418	261.867	9491.10	390.93	-55.30	-386.99	0.00	
9905.00†	91.418	261.867	9488.62	490.90	-69.44	-485.96	0.00	
10005.00†	91.418	261.867	9486.15	590.86	-83.59	-584.92	0.00	
10105.00†	91.418	261.867	9483.67	690.83	-97.73	-683.89	0.00	
10205.00†	91.418	261.867	9481.20	790.80	-111.87	-782.85	0.00	
10305.00†	91.418	261.867	9478.72	890.77	-126.01	-881.81	0.00	
10405.00†	91.418	261.867	9476.25	990.74	-140.15	-980.78	0.00	
10505.00†	91.418	261.867	9473.77	1090.71	-154.30	-1079.74	0.00	
10605.00†	91.418	261.867	9471.30	1190.68	-168.44	-1178.71	0.00	
10705.00†	91.418	261.867	9468.83	1290.65	-182.58	-1277.67	0.00	
10805.00†	91.418	261.867	9466.35	1390.62	-196.72	-1376.63	0.00	
10905.00†	91.418	261.867	9463.88	1490.59	-210.87	-1475.60	0.00	
11005.00†	91.418	261.867	9461.40	1590.56	-225.01	-1574.56	0.00	
11105.00†	91.418	261.867	9458.93	1690.53	-239.15	-1673.53	0.00	
11205.00†	91.418	261.867	9456.45	1790.50	-253.29	-1772.49	0.00	
11305.00†	91.418	261.867	9453.98	1890.47	-267.43	-1871.45	0.00	
11405.00†	91.418	261.867	9451.51	1990.44	-281.58	-1970.42	0.00	
11505.00†	91.418	261.867	9449.03	2090.41	-295.72	-2069.38	0.00	
11605.00†	91.418	261.867	9446.56	2190.37	-309.86	-2168.35	0.00	
11705.00†	91.418	261.867	9444.08	2290.34	-324.00	-2267.31	0.00	
11805.00†	91.418	261.867	9441.61	2390.31	-338.14	-2366.27	0.00	
11905.00†	91.418	261.867	9439.13	2490.28	-352.29	-2465.24	0.00	
12005.00†	91.418	261.867	9436.66	2590.25	-366.43	-2564.20	0.00	



Planned Wellpath Report

Preliminary
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INTEQ

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Field	(Cottonwood) Sec 22, T25S, R26E	Wellbore	No. 1H PWB
Facility	Cottonwood Draw 22 FED COM No. 1H		

WELLPATH DATA (44 stations) † = interpolated/extrapolated station

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	DLS [°/100ft]	Comments
12105.00†	91.418	261.867	9434.18	2690.22	-380.57	-2663.17	0.00	
12205.00†	91.418	261.867	9431.71	2790.19	-394.71	-2762.13	0.00	
12305.00†	91.418	261.867	9429.24	2890.16	-408.86	-2861.09	0.00	
12405.00†	91.418	261.867	9426.76	2990.13	-423.00	-2960.06	0.00	
12505.00†	91.418	261.867	9424.29	3090.10	-437.14	-3059.02	0.00	
12605.00†	91.418	261.867	9421.81	3190.07	-451.28	-3157.99	0.00	
12705.00†	91.418	261.867	9419.34	3290.04	-465.42	-3256.95	0.00	
12805.00†	91.418	261.867	9416.86	3390.01	-479.57	-3355.91	0.00	
12905.00†	91.418	261.867	9414.39	3489.98	-493.71	-3454.88	0.00	
13005.00†	91.418	261.867	9411.91	3589.95	-507.85	-3553.84	0.00	
13105.00†	91.418	261.867	9409.44	3689.92	-521.99	-3652.81	0.00	
13205.00†	91.418	261.867	9406.97	3789.88	-536.13	-3751.77	0.00	
13305.00†	91.418	261.867	9404.49	3889.85	-550.28	-3850.73	0.00	
13365.27	91.418	261.867	9403.00†	3950.10	-558.80	-3910.38	0.00	No. 1H BHL

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [srv ft]	Grid North [srv ft]	Latitude	Longitude	Shape
1) No. 1H BHL	13365.27	9403.00	-558.80	-3910.38	555664.39	403742.55	32°06'35.853"N	104°17'13.418"W	point

SURVEY PROGRAM Ref Wellbore: No. 1H PWB Ref Wellpath: Preliminary

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
18.00	13365.27	NaviTrak (Standard)		No. 1H PWB



Cimarex Energy Co. of Colorado

Location: Eddy County, NM
Field: (Cottonwood) Sec 22, T25S, R26E
Facility: Cottonwood Draw 22 FED COM No. 1H

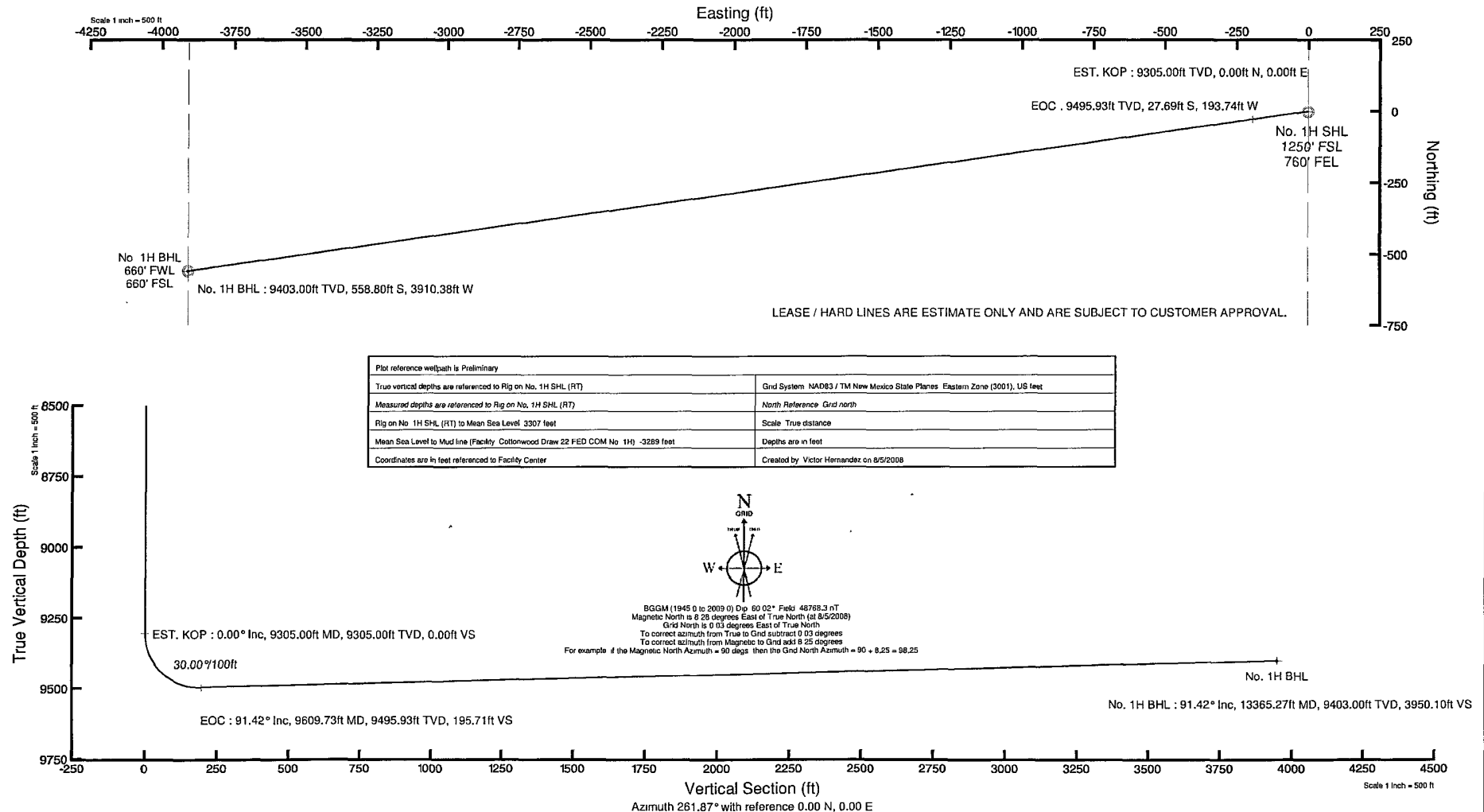
Slot: No. 1H SHL
Well: No. 1H
Wellbore: No. 1H PWB



INTEQ

Well Profile Data

Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (%100ft)	VS (ft)
Tie On	0.00	0.000	261.867	0.00	0.00	0.00	0.00	0.00
EST. KOP	9305.00	0.000	261.867	9305.00	0.00	0.00	0.00	0.00
EOC	9609.73	91.418	261.867	9495.93	-27.69	-193.74	30.00	195.71
No. 1H BHL	13365.27	91.418	261.867	9403.00	-558.80	-3910.38	0.00	3950.10



Cementing

HR®-601

Cement Retarder

HR®-601 retarder is a lignin-based, cement-set retarder that does not overly disperse slurries like other common retarders. This can help in slurries where stability is an issue such as water extended and foam. It is available in powder and liquid form.

Applications

HR-601 retarder can be used alone at bottomhole circulating temperatures between 140° and 275°F. When extended with intensifiers, it can be used at higher temperatures. Because it is non-dispersing, HR-601 retarder can be used with foamed cements.

Benefits

HR-601 retarder can provide the following benefits:

- Features stable slurries that do not require remedial work.
- Can be added directly to the mixing water or dry blended
- Interacts well with other cement additives
- Helps extend pumping times.

HR®-601 Retarder—Product Specifications			
Part No.	101328348	Bulk Density	30.5 lb/ft³
Form	Brown powder	Absolute Volume	0.1089 gal/lb
Specific Gravity	1.1		

HR®-601L Retarder—Product Specifications			
Part No.	101328350	Activity	40%
Form	Brown liquid	Pour Point	20°F
Specific Gravity	1.027	Freeze Point	15°F
Density	8.57 lb/gal	cps at 75°	125

HALLIBURTON

Cementing

Gilsonite

Lost-Circulation Additive

Gilsonite additive is an asphaltene hydrocarbon in granular form. Its particle size varies between 4- and 100-mesh. Gilsonite additive is commonly used to control lost circulation.

Applications

Gilsonite additive is effective at bottomhole temperatures (BHTs) between 60° and 230°F (16° and 110°C). Typical additive concentrations range from 5 to 50 lb/sk of cement.

Features

Gilsonite additive's low specific gravity helps improve its ability to control lost circulation. However, this feature can also cause the additive to separate to the top of thin slurries and slurries containing dispersants. Adding 2% or more bentonite to the slurry will help prevent separation.

Benefits

Gilsonite additive can provide the following benefits:

- When perforated, it is shatter-resistant.
- It does not significantly affect the setting time of cement.
- Gilsonite additive can provide higher strength than heavier additives with high water requirements.

Gilsonite Lost-Circulation Additive—Product Specifications			
Part No. (50-lb bag)	100001618	Specific Gravity	1.07
Form	Black, solid granules	Bulk Density	50 lb/ft ³

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PhenoSeal™ Lost Circulation Material

Control lost circulation and reduce thickening times

PhenoSeal™ lost circulation material can help cement slurries reduce fluid loss to the formation. The material is stable and insoluble in water, does not adversely affect compressive strength, and has a low specific gravity needed to control lost circulation.

Lost-circulation material has density variability. When using PhenoSeal lost circulation material, operators should use standard procedures to verify specific gravity and absolute volume factor on a regular basis.

In addition to controlling lost circulation, PhenoSeal lost circulation material can reduce thickening times. Ammonia, which acts as an accelerator, is released when PhenoSeal material reacts with cement. Operators can slightly increase the retarder concentration to compensate for these shorter thickening times.

Table 1-PhenoSeal lost circulation material - Product Specifications			
Part No.	Fine -101307741 Medium -101307742	Bulk Density	25 to 35 lb/ft ³
Physical State	Flake	Specific Gravity	1.30 to 1.55
Color	Variable	Odor	Odorless

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Cementing

Halad®-344

Fluid Loss Additive

Halad®-344 fluid-loss additive is especially useful in lightweight cementing compositions that often have long thickening times. The material is nonretarding, thus making good compressive strength development possible at low temperatures. Halad-344 additive performs as well in seawater as in fresh water, and is compatible with retarders, dispersants, and calcium chloride (CaCl_2).

Features

Halad-344 additive has no temperature limitations. Laboratory testing has shown that it is effective at 400°F or higher. Other features can include the following:

- Excellent fluid-loss control is available with very low concentrations of Halad-344 additive.
- Halad-344 additive is relatively salt-tolerant, which can make it effective with up to 18% salt in a variety of cement compositions.

Benefits

Halad-344 additive can provide the following benefits associated with low fluid loss in squeeze-cementing and primary cementing jobs.

Squeeze Cementing. In squeeze-cementing jobs, Halad-344 additive offers the following advantages:

- It helps reduce premature dehydration in tubing and casing while squeezing perforations.
- Long perforated intervals can often be successfully squeezed in a single stage.
- Satisfactory squeeze results can be obtained at low pressures without overdisplacement.
- The additive helps protect water-sensitive shale sections that may weaken and break down because of cement filtrate.
- Halad-344 additive helps reduce the amount of filtrate that can penetrate formations containing bentonite clays.

Halad®-344 Additive—Product Specifications			
Part No.	100003670	Bulk Density	26.00 lb/ft³
Form	White to off-white solid powder	Packaging	50-lb sack
Specific Gravity	1.220		

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Primary Cementing. Halad®-344 additive helps provide the following benefits during primary cementing jobs:

- It can lessen the possibilities of water and/ or emulsion blocks, and blocks caused by bentonitic clay swelling resulting from cement filtrate.
- Halad-344 additive helps protect water-sensitive shales, and can reduce premature bridging in annuli, which may be caused by dehydration.
- It also helps reduce loss of water from slurry, thus maintaining lower viscosities and circulating pressures.
- Halad-344 additive helps control gas leakage while cement is setting.

For more information on the benefits Halad®-344 Fluid Loss Additive can bring to your cementing operations, contact your local Halliburton representative.

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Cementing

D-Air 3000™ and D-Air 3000L™

Defoamers

Description

D-Air 3000™ and D-Air 3000L™ defoamers help control foaming of cement slurries.

Features

D-Air 3000 and D-Air 3000L defoamers have the following features:

- They offer significantly greater defoaming characteristics than previously available defoamers.
- They can replace D-Air 3 defoamer in Latex 2000 cement.
- They will not affect fluid loss, thickening time, or compressive strength.
- D-Air 3000 and D-Air 3000L defoamers are recommended for replacing the following defoamers:
 - NF-1
 - NF-3
 - NF-7
 - D-Air 2
 - D-Air 1

Applications

D-Air 3000 and D-Air 3000L defoamers can be used with a variety of slurries, including slurries with high yield points, and those containing additives such as HR®-12 retarder and sodium chloride (NaCl).

Recommended concentrations of D-Air 3000 and D-Air 3000L defoamers range from 0.0025% to 0.45% (0.005 to 0.5 gal/sk) by weight of cement (BWOC).

For more specific applications of D-Air 3000 and D-Air 3000L defoamers, please contact your local Halliburton representative.

Benefits

D-Air 3000 and D-Air 3000L defoamers can provide dependable foam control, even in slurries with high yield points and slurries containing additives such as HR-12 retarder and sodium chloride (NaCl).

D-Air 3000 Defoamer—Product Specifications			
Form	Powder	Packaging	50-lb sack
Color	Tan	SAP No.	101007446
Specific Gravity	1.35	Part No.	516.01248
Bulk Density	25.2 lb/ft ³		

D-Air 3000L Defoamer—Product Specifications			
Form	Liquid	Pour Point	34°F
Color	Tan	Packaging	5-gal bucket
Specific Gravity	0.93	SAP No.	101007444
Bulk Density	7.75 lb/gal	Part No.	516.01249
Boiling Point	>200°F		

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HALLIBURTON
Fluid Systems

Cementing

CFR-3™ Cement Friction Reducer

Dispersant

Halliburton CFR-3 friction reducer helps reduce the apparent viscosity and improve the rheological properties of a cement slurry. As a result, turbulent flow can be achieved at lower pumping rates, which results in reduced friction pressure during pumping.

When a slurry's apparent viscosity is reduced, the slurry can be mixed at a higher density by reductions in the amount of mix water added. Although the slurry is denser, it remains easy to pump and will require less, possibly no, weighting material.

CFR-3 friction reducer also helps improve fluid-loss control and can provide slight slurry retardation.

Features

CFR-3 friction reducers are available with or without defoamer. When defoamer is used, the mixing concentration is 0.3 to 1.5 percent. Without defoamer, the mixing concentration is 0.3 to 1.0 percent. Both products can be applied in wells above 60°F (16°C) in all API cement classes.

Benefits

CFR-3 friction reducers can provide the following benefits:

- Reduced hydraulic horsepower requirements.
- Greater turbulence at lower pump rates.

CFR-3™ Cement Friction Reducer (with Defoamer) - Product Specifications			
Part No.	100012206	Bulk density	38.00 lb/ft ³
Form	Red-brown solid	Packaging	50-lb bag
Specific gravity	1.16		

CFR-3™ Cement Friction Reducer (without Defoamer) - Product Specifications			
Part No.	100003653	Bulk density	38.00 lb/ft ³
Form	Dark red-brown solid powder	pH	7 to 9
Specific gravity	1.17	Packaging	50-lb bag

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HALLIBURTON
Fluid Systems

Cementing

HR[®]-7

Cement Retarder

HR[®]-7 retarder is a sodium lignosulfonate that can be used as a retarder and dispersant in all API classes of cement as well as Pozmix[®] cement.

Applications

HR-7 retarder can be used in wells with bottomhole circulating temperatures (BHCTs) between 110° and 170°F (43° and 77°C). This retarder's dispersing capabilities are particularly useful in cements containing high gel percentages. In these slurries, HR-7 retarder decreases air entrainment. It can also be used to help control fluid loss in slurries that are subjected to high shear rates.

Benefits

Small amounts of HR-7 retarder can extend a slurry's temperature range and yield a smoother, more uniform slurry. In addition, HR-7 retarder can provide the following benefits:

- extended pumping times
- early cement-strength development
- more predictable thickening times
- improved slurry displacement rates at steady pressures

HR [®] -7 Retarder—Product Specifications			
Part No.	100005055	Bulk Density	38.00 lb/ft ³
Form	Solid black powder	Packaging	50-lb bag
Specific Gravity	1.410		

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**For more information on the benefits HR[®].7 Cement Retarder can bring
to your cementing operations, contact your local Halliburton representative.**

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HALLIBURTON

I. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified a minimum of 4 hours in advance for a representative to witness:

- a. Spudding well
- b. Setting and/or Cementing of all casing strings
- c. BOPE tests

☒ **Eddy County**

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,
(575) 361-2822

1. A Hydrogen Sulfide (H₂S) Drilling Plan should be activated 500 feet prior to drilling into the **Delaware** formation. **Hydrogen Sulfide has been reported in this township measuring 1200-1500 ppm in STVs. If Hydrogen Sulfide is encountered, please report measured amounts and formations to the BLM.**
2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

B. CASING

Changes to the approved APD casing and cement program require submitting a sundry and receiving approval prior to work.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) time for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

High cave/karst.

Possible lost circulation in the Delaware.

Possible abnormal pressure in the Wolfcamp.

1. The **13-3/8** inch surface casing shall be set at **approximately 315** feet and cemented to the surface.
 - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with a surface log readout will be used or a cement bond log shall be run to verify the top of the cement.
 - b. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - c. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:
 - ☒ Cement to surface. If cement does not circulate see B.1.a-c above. **Casing to be set in the Lamar Limestone. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to high cave/karst.**

Formation below the 9-5/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe (not the mud weight required to prevent dissolving the salt formation) and the mud weight for the bottom of the hole. If formation fails test, the casing program will have to be reviewed to mitigate the potential of an underground blowout. Contact BLM with results.

-
3. The minimum required fill of cement behind the **5-1/2** inch production casing is:

- a. First stage to DV tool, cement shall:
 - ☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office, before proceeding with second stage cement job.

b. Second stage above DV tool, cement shall:

- ☒ Cement to circulate **due to requirement of two casing strings cemented to surface in high cave/karst area and cave depth is 350' in this area.** If cement does not circulate, contact the appropriate BLM office, before proceeding with second stage cement job. **Additional cement will be required.**

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

Contingency Casing Program:

1. The minimum required fill of cement behind the 7 inch intermediate casing is:

a. First stage to DV tool, cement shall:

- ☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office, before proceeding with second stage cement job. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to high cave/karst.**

b. Second stage above DV tool, cement shall:

- ☒ Cement to circulate **due to requirement of two casing strings cemented to surface in high cave/karst area and cave depth is 350' in this area.** If cement does not circulate, contact the appropriate BLM office, before proceeding with second stage cement job. **Additional cement may be required. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to high cave/karst.**

Formation below the 7" window to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe and the mud weight for the bottom of the hole.

2. The minimum required fill of cement behind the 4-1/2 inch production casing is:

- ☒ Cement to come to top of liner. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. **Variance approved to use flex line from BOP to choke manifold. Check condition of 4 11/16" flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Anchors required by manufacturer are to be used. Line to be as straight as possible with no hard bends.**
3. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - a. The tests shall be done by an independent service company.
 - b. The results of the test shall be reported to the appropriate BLM office.
 - c. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
 - d. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.
 - e. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the **Wolfcamp** formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.
 - f. A variance to test only the surface casing to the reduced pressure of **1000 psi** with the rig pumps is approved. **The BOP will be tested to 3000 psi by an independent service company.**

D. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the **Wolfcamp** formation, and shall be used until production casing is run and cemented.

E. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

WWI 091308
